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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/925,647	08/10/2001	Takao Nakazaki	058856-0105	4454

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EXAMINER

GLASS, CHRISTOPHER W

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 11/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/925,647

Applicant(s)

NAKAZAKI ET AL.

Examiner

Christopher W. Glass

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Title

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

2. Figure 18 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:
On line 13 of page 3, "various kinds optical modules" is grammatical incorrect and could be replaced by "various kinds of optical modules".
On lines 4 and 7 of page 4, "a" should be inserted after "provide" and before "light".
On line 21 of page 15, "connector 84" should be "connector 84a", as suggested by Figure 10 and other corresponding parts of the specification.
Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
5. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

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the invention. The language “is devoid of” constitutes a negative limitation and is unacceptable, since it only describes an aspect that the mounting positions do *not* have.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3,9,10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 3,805,061 to De Missimy et al. (De Missimy).

Regarding claim 1: Shown in Figure 1 is a light curtain generating device, comprising a light emitting pillar assembly accommodating an array of light emitting units **8** within a pillar case **2** and a light receiving pillar assembly accommodating an array of light receiving units **18** within a pillar case **4**, the light emitting pillar assembly and light receiving pillar assembly being placed opposite to each other so as to form a light curtain for detecting an object between the pillar assemblies, characterized in that the light emitting unit array **8** and light receiving unit array **18** accommodated in the respective pillar cases **2** and **4** each comprise a group of single-beam optical modules.

Regarding claim 2: Each opposing pair of the light emitting unit and light receiving unit perform a detecting action in a prescribed order (see Column 2, lines 27-50 and especially lines 33-37, as well as Column 3, lines 21-26).

Regarding claim 3: Each single-beam optical module of De Missimy consists of a light emitting unit (with emitter **8**) or a light receiving unit (with detector **18**), comprising a lens **14**, an

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optical element (aperture) and a holder 12A,12B,12C, or 22A,22B,22C integrally incorporated with them so as to align them with a prescribed optical axial line (see Column 3, line 58 – Column 4, line 16).

Regarding claims 9 and 10: As shown by Figure 1, the light curtain generating device of De Missimy comprises a circuit board in each of the emitter and receiver assemblies 2 and 4, respectively, having a plurality of optical element mountable positions, and signal processing means (shown in Figures 2 and 6) for electrically and selectively disabling the optical element mountable positions (see Column 2, lines 32-37; Column 3, lines 21-27; Column 4, line 63 – Column 5, line 16). Each pillar assembly 2,4, is shown as comprising a base frame (having back panels 10 and 20, and mounting panels 12A-C and 22A-C) defining mounting positions for single-beam optical modules, and a plurality of optical modules (including emitters 8 or receivers 18 and lenses 14) mounted in the mounting positions of the base frame.

Regarding claim 13: Each pillar assembly 2,4 of De Missimy is shown as comprising a base frame (having back panels 10 and 20, and mounting panels 12A-C and 22A-C) arranged in series along a length of the assemblies and defining mounting positions for single-beam optical modules, and a plurality of optical modules (including emitters 8 or receivers 18 and lenses 14) mounted in the mounting positions of the base frame.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 4,5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Missimy, in view of U.S. Patent No. 5,302,942 to Blau.

Regarding claim 4: The panel holders (12A-C or 22A-C) of the light curtain device of De Missimy are not specifically taught as being made of plastic material. However, it is well known in the art to use plastic in the construction of such elements. Figure 5 of Blau shows a light curtain system having a "molded plastic support 64" on which are formed sockets for the light receiving and emitting elements. It would have been obvious to one having ordinary skill in the art at the time the invention was made to compose the panel holders of plastic in the device of De Missimy, due to this material's light weight, potential rigidity, and low cost. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims 5 and 8: The modified device of De Missimy does not expressly disclose the lens 14 and optical element as jointed to the plastic holders (12A-C,22A-C) by snap fit arrangements. It is well known in the art, however, to implement sockets for each of the optical modules. Figure 5 of Blau shows a light curtain system having a molded plastic support 64 with sockets 66, mounted with either an LED 72 or phototransistor 19 (see Column 4, lines 31-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize such a socket arrangement in the device of De Missimy, and to snap-fit the optical elements 8,18 and lenses 14 in these sockets, instead of using more permanent methods such as glue or solder, in order to provide an efficient means for removing and replacing defective elements (e.g. receivers or emitters) in each optical module.

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10. Claims 6,7,11, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Missimy. De Missimy shows in Figure 1 groups of single-beam optical modules (having either emitters **8** or receivers **18** and lenses **14**) comprising an optical module block (groups **6A-C** and **16A-C**) including a plurality of single-beam optical modules arranged in a single row. Each optical module of these blocks is shown attached to the transmitter housing **2** or receiver housing **4** as to extend in parallel with the optical axial line. The panels (**12A-C** and **22A-C**) having these modules attached thereon and arranged in single rows are not specifically taught as being made of metal or metallic plates. However, it would have been obvious to one having ordinary skill in the art to use metal in forming these elements, due to this material's rigidity and electrical conductive properties. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

11. Claims 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Missimy, in view of U.S. Patent No. 6,175,106 to Buitkamp et al. (Buitkamp). The device of De Missimy does not specifically teach some of the mounting positions for the emitting and receiving optical modules as being empty, or the arrangements as staggered between the presence and absence of such elements. Also, De Missimy does not expressly disclose the mounting positions of the base frame members (including panels **12A-C** and **22A-C**) as having different pitches, or the base frames as having different numbers of mounting positions or lengths (compared to the other corresponding base frame/panel). It is well known in the art to employ arrangements of staggered or open mounting positions with or without optical modules, however. Figures 1 and 4 of Buitkamp show a light grid, having a transmitting strip **2** and

corresponding receiver strip 3, comprising optical modules with emitter elements 7 or receiver elements 15 mounted on circuit boards 6,14. "Basically, it is not necessary to fit out all the mounting locations provided on the circuit boards 6,14 with transmitter and/or receiver elements 7,14. For example, only every second mounting location can be equipped"(Column 8, lines 14-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to implement such a setup in the device of De Missimy in order "to produce different light grids" and therefore create different light arrangements to fit a specific application-specific need, such as only providing light beams only in areas of a machine where object detection and safety is a concern (Column 8, line 23). It also would have been obvious to arrange the mounting positions on each base frame/panel member in different configurations in terms of pitch, number, and length; such variation would offer the above-mentioned advantages, as well as allow more possible combinations of emitter-receiver placement further adapting the device to operate in various environments by providing more allowed beam positions without wasting locations that might be obstructed.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

U.S. Patent No. 6,236,036 to Kudo et al. discloses a multi-optical path photoswitch, showing a light curtain configuration in Figure 2 and signal processing/generating circuitry in Figure 1.

U.S. Patent No. 6,414,603 to Yamaguchi et al. also concerns a multi-optical-axis photoswitch having light curtain configurations with varying spatial orientation/grouping of the optical modules, as well as signal processing/generating circuitry.

U.S. Patent Nos. 6,297,498 and 6,294,777 to Shteynberg et al. disclose modular articulated light curtains, employing multiple linear arrays of emitting and receiving elements, connected to form non-linear overall shapes.

U.S. Patent No. 6,239,423 to Hama concerns an area sensor with an optical axis having narrow angular characteristics.

U.S. Patent No. 6,166,371 to Milbrath et al. discloses a diffuse reflective light curtain system for use in defining the border of a work zone for a robotic machine. The emitting elements and receiving elements are provided in alternating formation on the same pillar assembly. Multiple linear pillar assemblies can be joined together to form surrounding light curtains, as shown by Figure 2.

U.S. Patent No. 5,461,227 to Blau concerns optical sensing arrays, and in one embodiment the light beams of at least a pair of channels of the light curtain are intentionally mispointed.

U.S. Patent No. 5,198,661 to Anderson et al. discloses a segmented light curtain system and method.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher W. Glass whose telephone number is 703-305-1980. The examiner can normally be reached 9:30am-6:00pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached at 703-308-4852. The fax phone number for the organization where this application or proceeding is assigned are 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


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November 13, 2002


STEPHONE ALLEN
PRIMARY EXAMINER